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In the Matter of )  
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ADVANCED TELEVISION SYSTEMS AND ) MM Docket No. 87-268  
THEIR IMPACT ON THE EXISTING )  
TELEVISION BROADCAST SERVICE )

AT&T REPLY COMMENTS

Pursuant to the Commission's May 8, 1992 Second Report and Order/Further Notice of Proposed Rulemaking ("FNPRM"),<sup>1</sup> American Telephone and Telegraph Company ("AT&T") hereby replies to the comments on the FNPRM.

The FNPRM (para. 80) seeks comment on, among other things, the Advisory Committee's conclusion that the systems currently under consideration represent the state of available technology for an advanced television system ("ATV" or "HDTV"). In its comments, AT&T demonstrated that no delay in Commission action is necessary or appropriate as a result of issues related to alternative technologies or to HDTV receivers and converters. Instead, the Commission should proceed with its plan to establish a firm schedule for the transition to HDTV. That schedule can then be adjusted, if necessary, at an appropriate mid-point in the deployment of HDTV in light of actual experience.

<sup>1</sup> Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service, MM Docket No. 87-268, FCC 92-174 (released May 8, 1992).

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These reply comments principally address questions raised by Professor William F. Schreiber concerning alternative HDTV technologies. Professor Schreiber advocates delay and evaluation of new technologies which are neither proven nor necessary in light of the established capabilities of the systems proposed by the Zenith/AT&T team and other proponents. These reply comments also take issue with the suggestion by Sony Corporation that the Commission involve itself in the specification of standards by which the entertainment industry makes HDTV programming.

I. The OFDM And SFN Technologies Advocated By Professor Schreiber Do Not Warrant Consideration By The Commission In This Proceeding.

The Commission asked parties to discuss the Advisory Committee's conclusion that the systems currently under consideration represent the state of available technology.<sup>2</sup> AT&T explained in its comments that it is aware of no new technological developments which warrant any delay in the selection of an HDTV system. Further technological developments will always occur, but an all-digital system such as that proposed by Zenith and AT&T can accommodate such developments if appropriate.

Professor William I. Schreiber, a professor emeritus at the Massachusetts Institute of Technology, disagrees with AT&T. Professor Schreiber acknowledges that

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<sup>2</sup> FNPRM, para. 80.

the systems now under consideration by the Commission "probably do represent the state of the art with respect to source coding (data compression) . . . ." <sup>3</sup> He claims nevertheless that the proposed systems do not represent the state of the art with respect to HDTV transmission. Id. Specifically, Professor Schreiber advocates two forms of digital broadcasting technologies now being considered in Europe: orthogonal frequency-division multiplex ("OFDM") and single frequency networks ("SFN").

The European technologies advocated by Professor Schreiber do not warrant consideration by the Commission. First, they are largely untested. Second, and more fundamentally, these technologies do not offer significant advantages over the Zenith/AT&T system now before the Commission.

The OFDM technology advocated by Professor Schreiber is a modulation method which uses multiple low-speed carriers to combat multipath and frequency selective fading. This technology, which has been available for several years and may be useful for other services, is not promising for HDTV. As Dr. Woo H. Paik pointed out in his affidavit which accompanied the comments of General Instrument, OFDM is probably prohibitively complex for digital HDTV applications because it would require 500 or

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<sup>3</sup> Comments of William F. Schreiber, p. 3 (July 15, 1992) ("Schreiber Comments").

more subchannels to support the higher data rate requirements.

Moreover, AT&T anticipates that OFDM would have a number of other problems in an HDTV application. First, the effects of non-linearities in the transmitter could cause serious intermodulation among the OFDM signals themselves, which could result in unacceptable interference to other channels (both OFDM channels and NTSC channels). Second, the effects of NTSC co-channel and adjacent channel interference with an OFDM channel are completely unknown. Third, OFDM would likely present difficulties for cable transmission, which, unlike the situation in Europe, is now one of the predominant forms of television delivery in the United States. Optimizing an OFDM multi-channel transmission for both cable and over-the-air transmission would be difficult because of the different range of delays for cable. Fourth, the inefficiencies of OFDM systems are not known. For example, the use of guard bands and possible imperfections in filtering approximations may well reduce the effectiveness of OFDM. In short, OFDM technologies would present a number of problems in an HDTV application, which can be avoided by using one of the systems already under consideration.

Professor Schreiber's SFN proposal for extending range with a cellular-like transmission plan suffers similar flaws. An SFN approach would require a wholesale revision of channel allocations, resulting in an entirely new

transmission plan. The resulting disruption in the broadcast industry would not serve the public interest. Moreover, an SFN approach may require signals in a given locality to use the same transmitting antenna, which again would dramatically change the current relationships in the broadcasting industry.

In short, evaluation of the OFDM and SFN technologies would entail significant delays in the introduction of HDTV and, in the end, would likely not function as well as the existing systems. Professor Schreiber's comments imply serious flaws in the broadcasting capabilities of the current systems, but he does not identify those flaws. Fortunately, speculation about the capabilities of the existing proposed systems is not necessary, because the Commission's test plan will confirm how the systems under consideration perform.

## II. The Commission Should Not Establish Standards For The Production Of HDTV Programming

The Sony Corporation urges the Commission to extend the scope of this proceeding unnecessarily and attempt to regulate the "production standard" by which HDTV programming is created.<sup>4</sup> Sony proposes adoption of the SMPTE 240/260M standard.

Sony's proposal goes beyond the appropriate boundaries of this proceeding and, in all events, is

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<sup>4</sup> Sony Comments, pp. 8-26.

unsound.<sup>5</sup> The Commission's stated objective is to establish standard for the transmission of HDTV television. Once that standard is established, the market will ensure that programming is produced which can be broadcast over the chosen HDTV format. If establishment of a production standard makes sense, industry bodies exist that can reach agreement on an appropriate standard. This Commission, however, does not need to get involved in the methods chosen by the entertainment industry to produce movies or television programming.

#### CONCLUSION

For the reasons stated herein and in AT&T's previous submissions, the Commission should continue to

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<sup>5</sup> Substantively, Sony's proposal has several flaws. The SMPTE 240/260M standard is not equally compatible with all of the HDTV proposals. Moreover, contrary to Sony's suggestion, the industry will likely need several levels of performance for production formats, rather than a single standard. For example, appropriate production standards for news programming may differ from the standards used for entertainment. The Commission's interoperability goals appropriately recognize that conversions among various production formats should be routine and affordable.


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establish firm procedures and schedules for implementing HDTV. Delays in the Commission's process are neither necessary nor appropriate.

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CERTIFICATE OF SERVICE

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